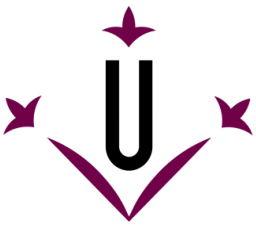

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Older people's production and appropriation of digital videos: an ethnographic study

While most of today's children, young people, and adults are both consumers and producers of digital content, very little is known about older people as digital content creators. Drawing on a 3-year ethnographic study, this paper reports on the digital video production and appropriation of approximately 200 older people (aged 60 to 85). They generated 320 videos over the course of the study. We show their motivations for engaging in digital video production, discuss their planned video making, and highlight their creativity while editing videos. We show the different meanings they ascribed to digital videos in their social appropriation of these objects, the meaningful strategies they adopted to share videos, and the impact on their perceived wellbeing. Furthermore, we outline the solutions the participants developed to overcome or cope with interaction issues they faced over time. We argue that the results portray older people as active and creative makers of digital videos with current video capturing, editing, and sharing technologies. We contend that this portrayal both encourages us to re-consider how older people should be seen within Human-Computer Interaction and helps to frame future research / design activities that bridge the grey digital divide.

Keywords: older people; digital video production; digital video appropriation; ethnography.

1. Introduction

"As the capacity to capture video is being incorporated into more pervasive artefacts (such as mobile phones), the opportunities for non-professional video-makers to make, watch and exchange video have equally increased" (Kirk et al. 2007, 61). Furthermore, new ways of producing video content, which are enabled by cheap production tools and

high bandwidth communication networks (Juhlin et al. 2013), have emerged. The digital video production and appropriation[1] of digital videos by children, teenagers, and adults have been explored (e.g., Kirk et al. 2007; Yarosh et al. 2016). However, we argue that older people (60+) have been mostly overlooked, despite an ever-increasing ageing population, a growing number of studies of technology use by this user group (Hope, Schwaba, and Piper 2014; Ling 2008; Werner, Werner, and Oberzaucher 2012), and the rise in prominence of digital videos in today's participatory culture (Jenkins 2009). In this paper, we aim to examine the digital video production and appropriation of older people with diverse age ranges and previous practical knowledge of Information and Communication Technologies (ICTs).

This paper draws on an ethnographic study of ICTs use conducted in a Catalan adult educational center over a 3-year period (2010-2013) with approximately 200 older people (hereinafter, participants), aged 60 to 85. The study was initially aimed at understanding the usability and accessibility of a broad number of ICTs, ranging from tablets to Internet browsers, for this user group. Our first results showed that older adults in different settings were interested in learning ICTs by interacting with multimedia content and digital entertainment (Ferreira, Sayago, and Blat 2014; 2016). As the study progressed, we witnessed how our participants moved from seeking and watching videos on YouTube to creating and editing their own digital videos and sharing them. Participants' first contact with digital videos was often by watching those they received from friends or family members via e-mail or social networks. With more experience, though, they desired to create and share their own videos. Participants'

[1] In this paper, appropriation is defined as "the way in which technologies are adopted, adapted and incorporated into working practice" (Dourish, 2003, 467).

production of digital videos (N = 320) was significant over the course of the study. Consequently, we decided to examine their digital video production and appropriation.

What was their motivation for engaging in digital video production? By creating digital videos, our participants perceived that they could share with their relatives and friends key moments of special occasions, keep alive memories of their relatives, take forward their journey towards ICTs proficiency, and feel more socially included. Over the course of the study, we could observe how these perceived benefits turned into real ones, making them feel more socially included. Participants actually learned more aspects of technologies. They also increased and enriched their conversations with relatives and friends. While previous studies have come to the conclusion that "computer use has no demonstrated impact on the wellbeing of older adults" (Dickinson & Gregor, 2006, 744), our results encourage us to draw a different conclusion.

How did our participants produce digital videos? As opposed to teenagers, who have been found to "spontaneously use(d) their cameras at any and all times, and not, so to speak, at 'special times'" (Kirk et al. 2007, 65), the making of digital videos of our participants was much more planned. When our participants intended to keep and share memories of special events, they used compact digital cameras, camera phones or tablets. When they wanted to take their ICTs learning forward, however, they tended to download online pictures from Google Images and put them together into a digital video using *MovieMaker*. While current Human-Computer Interaction (HCI) research with older people is mostly driven by coping with the "downsides of ageing" (Y. Rogers et al. 2014, 3913), and dominated by the "biomedicalisation of older people" (Vines et al. 2015, 16), our participants showed a lot of creativity when producing and editing videos. In this paper, by creativity we mean (a) artistic selection of the topics, colors, fonts, effects, and music of their videos, and (b) coming up with clever and effective

solutions to issues they were faced with when interacting with ICTs. Thus, our results suggest that adding *creativity* to current research efforts could potentially inform the design of ICTs that are not only more usable and accessible for older people, but more meaningful and enjoyable in their everyday lives.

How did our participants appropriate digital videos? Our participants emphasized privacy, control, and perhaps, most importantly, meaningfulness in their digital videos appropriation. It was scary for most of them to think that the "whole Internet", as they put it, could watch their videos. They did not see why they were supposed to make their videos available through video sharing sites. In their opinion, their videos would only be useful to their relatives and friends. Instead of being discouraged by this 'public' factor, our participants developed their own strategies to share videos by using ordinary (i.e., not specifically designed for them) technologies in a private, controlled, and meaningful way. They shared videos on their Facebook wall when they considered that the content of the videos could be of interest to their friends. When the content of the videos was highly personal, however, they shared videos either face-to-face (e.g., using DVDs or USB flash drives) or via e-mail.

If this appropriation is compared with how most people share digital videos, it could be undervalued for its lack of novelty. However, a different perspective emerges when one considers (a) ageing myths, which portray older people as "being unable to use technologies", (b) and the need for designing ICT specifically for them, e.g., "if (they) are to become digital content producers as well as consumers, it is necessary to provide tools enabling them to easily create and share content in non-threatening and supportive environments" (Waycott et al. 2013, 41). We argue that our results dispel myths and challenge predominant design approaches. Our results also suggest that the way in which they adapt and adopt digital videos into their everyday lives is not so

unique or particular to this user group, challenging the heterogeneity typically associated to older adults as a user group within HCI (e.g., (Gregor and Newell 2001)). These findings present a number of design and research opportunities, which are discussed later in the paper.

Creating, editing, and sharing digital videos were not straightforward tasks for our participants, as they had to cope with a number of interaction issues, which ranged from too much information displayed on user interfaces to unfamiliar terminology. Carrying out these tasks also entailed using ICTs (e.g., professional video editing suites) that, in their opinion, could help them improve their production of digital videos. Consequently, participants had to learn how to use ICTs that were new for them. By drawing upon the long-term aspect of the study, we discuss whether participants' difficulties in using ICTs were due to either a lack of experience with them or ageing issues. The former is typical of most of today's older people, while the latter will continue when most of today's adult people, who have grown up with digital technologies, grow older (Hanson 2009). Even when they acquired more experience with ICTs, participants always complained about having to deal with too much information on physical (e.g., video camera) and software (e.g., Facebook) user interfaces. To overcome, or, at least, cope with these time-persistent barriers, participants came up with their own solutions, which we show and discuss in an attempt to (a) enrich current design guidelines for older people and (b) inspire the design of more accessible and pleasant to use user interfaces for the current and the next generation of older people.

2. Related work

Posting videos online is a fast-growing trend. The percent of American adult Internet users who upload or post videos online doubled from 14% in 2009 to 31% in 2013. That

includes 18% of adult Internet users who post videos they have created or recorded themselves (Purcell 2013). Yet, research studies of digital video production and appropriation by older people are rare.

Surveys show that older people are starting to use social media more and more (Hope, Schwaba, and Piper 2014). Older adults are also said to be increasingly adopting mobile phones (Ling 2008) and tablets (Werner, Werner, and Oberzaucher 2012). Research studies suggest that recording and watching home videos might be a familiar activity for most older people (Chalfen 1988). Previous research also suggests that digital content production can provide important opportunities for their social engagement and self-expression (Waycott et al. 2013). In fact, it is argued that "news, public discussions and product marketing emphasize the possibility to have a video camera in settings and situations previously unlikely" (Lehmuskallio and Sarvas 2008, 257), and "one only has to look at online repositories of video such as YouTube to begin to understand how growing access to digital video is widening participation in a new culture of video production, exchange and viewing" (Kirk et al. 2007, 61).

However, those previous studies[2] which have examined (a) digital video practices by non-professionals (O'Connor and Fitzpatrick 2009; Lehmuskallio and Sarvas 2008; Kirk et al. 2007; Chalfen 1988), (b) emerging issues introduced by personal media (photos and videos) on the web, such as ownership and remix (Marshall

[2] The papers cited are the most popular or recent ones found in our desk-based search using different combinations of the following keywords (video, videowork, user-generated content, UGC, YouTube, video content creator, understanding, uploader, user and behaviour) in 4 academic databases: Scopus, Web of Science, Google scholar, and ACM DL.

and Shipman 2011; Marshall and Shipman 2013; Diakopoulos et al. 2007; Kruitbosch and Nack 2008), and (c) video as user generated content (e.g., Gill et al. 2007; Cha et al. 2007; Rodriguez, Cha, and Kwak 2009; Cheng, Liu, and Dale 2013; Park, Jung, and Lee 2011), have not either considered or been conducted with older people. An exception is an online survey with 290 online Korean people aged 50 and over (Ryu, Kim, and Lee 2009). Respondents reported their willingness to adopt video creation services if some conditions, such as ease of participation, usefulness, and enjoyment, were satisfied. Another exception are Harley and Fitzpatrick's studies (Harley and Fitzpatrick 2009; 2008), which analyzed 8 videos generated and uploaded by an older person, Peter, also known as 'Geriatric1927' and the subsequent responses. These studies suggest that inter-generational contact, reminiscence, reciprocal learning, and co-creation of content, emerged from how the videos produced by Peter were used in YouTube.

Thus, there is room for claiming that addressing digital video production and consumption by older people is a timely and important topic, which has received scant research attention thus far.

3. The ethnographic study

3.1 Background

We regard people's interactions with ICTs as situated, because "people's understanding of the world, themselves, and interaction is strongly informed by their varying physical, historical, social, and cultural situations" (Harrison, Sengers, and Tatar 2011, 388). We also consider that "the specifics of particular contexts greatly define the meaning and nature of an interaction" (Harrison, Sengers, and Tatar 2011, 388). Thus, ethnography, with its focus on "gaining an insider's view of a situation" (Blomberg and Burrell 2009,

74), should help us understand the situated digital video production and appropriation of older people.

Ethnography has been one of the basic and transversal themes in HCI papers since 2004 (Liu et al. 2014). Ethnography is also a key element in the evolution of paradigms (or waves) of HCI research (Bødker 2006). Yet, most studies with older people conducted within HCI thus far have adopted a survey or a laboratory-oriented approach (Sayago and Blat 2011).

There are several forms of ethnography, ranging from the traditional first-hand observations and conversations over an extended period of time (Fetterman 2010) to quick-and-dirty ethnography (Hughes et al. 1994), which has been developed to fit ethnography within software engineering development processes. We adopted the former because we considered that the key features of classical ethnography (natural settings, holism, description and members' point of view) (Blomberg and Burrell 2009) were key to attain our goal of understanding older people's digital video production and appropriation.

3.2 The setting

We conducted our study in Àgora (AG)[3], a 30-year-old adult educational center in the district of La Verneda-St. Martí in Barcelona (Spain). Since the 1980s, AG has been fostering the social inclusion of people who are, or might be, excluded from the Catalan society, such as immigrants and older people. To this end, AG adopts a dialogical learning approach (Aroca 1999), which empowers the students - using AG terminology, *participants* - to decide what they want to learn in free courses. Their decision is usually

[3] http://www.edaverneda.org/edaverneda/en

based on needs they aspire to fulfill in their everyday lives, e.g., learning ICTs or Catalan. AG participants regard ICTs as instrumental in fostering social and digital inclusion. ICT courses take place daily and are mostly attended by older participants. Volunteers, who are mostly also older people that became fairly independent ICT users by enrolling in ICTs courses in AG, help to run the courses. Other volunteers are Bachelor, Masters or PhD students conducting academic fieldwork activities.

3.3 Participants: profile and recruitment

Two hundred and two older people (women: 113, men: 89; 50% age 60-69, 46% age 70-79, 4% age 80-85) took part in our study. Their participation in the activities was dynamic and varied, depending on participants' availability and personal interests. Fourteen percent of the participants were involved in the learning activities throughout the study, while approximately 39% took part in two or more courses, and 47% attended one full course/workshop. Informal conversations between one of us (the first author – fieldworker) and the participants revealed that they came from several Spanish regions and that their educational attainment was low (around 70% had completed primary school only). They often reported knowing each other because of living in the same neighborhood and/or taking part in the same activities in AG. Participants reported that they had been using computers and the Internet from three months up to eight years. Most of them reported, and our observations confirmed, that they conducted basic and more advanced computer tasks, such as looking for information online and e-mailing, without requiring much assistance.

Participants in courses and workshops were recruited through the standard AG procedure, which consists of signing up for activities in the secretariat, wherein they are informed about the activities and the person who organizes them. Their participation was voluntary and the main inclusion/exclusion criteria were (a) whether the activity

was full or not, and (b) if their level of experience with ICTs met the requirements of the activity. Participants' expertise with ICTs was assessed by members of the secretariat on the basis of what participants told them about their practical knowledge of computers and the Internet while signing up for courses and workshops.

3.4 Activities: courses and workshops

Seventeen courses and 10 workshops were conducted from December 2010 to December 2013. These activities took place in AG's Internet room, which consisted of 9 desktop computers (Figure 1) running Windows XP. The maximum number of people allowed in that room was 19 (2 participants sharing a PC and the person in charge of the activity).

Figure 1 – Participants in the Internet room.

Table 1 describes video content creation activities run by the fieldworker. Table 2 describes other ICTs courses and workshops attended by the fieldworker as part of her immersion in AG and initial goal of understanding ICTs accessibility and usability for

older people. The number of participants, the duration of the activities, and the roles adopted by the fieldworker are detailed in Table 1 and 2. Fifty-one participants enrolled in video creation courses and half of them (24) in two or more courses (Table 1). Participants of the video creation courses knew how to use the mouse and looked for information online. Courses lasted up to 12 weeks and were run in weekly sessions of two hours long. Workshops were usually run in a 2-hour session.

Role	Activity	Number of Participants	Description of the activity	Sessions
Volunteer running courses	Introductory Workshops	G1: 14 (6m - 8f) G2: 09 (9f)	Hands-on activities on creation of video content.	G1: 02 sessions G2: 02 sessions
	Video Creation Courses	G1: 09 (6m - 3f) G2: 16 (12m - 4f) G3: 18 (8m - 10f) G4: 14 (9 m - 5f)	Hands-on activities on video creation, watching, editing and sharing.	G1: 06 sessions G2: 10 sessions G3: 10 sessions G3: 10 sessions

Table 1 - Video content creation courses.

Role	Activity	Number of Participants	Description of the activity	Sessions
Volunteer helping the person in charge of the course	Course on Natural Parks	G1: 11 (6m -5f) G2: 11 (6m - 5f) G3: 13 (6m - 7f) G4: 11 (5m - 6f)	Download and edit pictures from the web. Create/share documents (MS Power Point).	G1: 04 sessions G2: 06 sessions G3: 05 sessions G4: 04 sessions
	Project Activities: Connect [4]	G1: 08 (4m - 4f)	Discuss project outcomes and making a video with participants.	G1: 04 sessions
Research Projects. 4 researchers in the field.	General ICTs course	G1: 12 (6m - 6f) G2: 18 (7m - 11f) G3: 18 (8m - 10f) G4: 18 (9m - 9f) G5: 17 (9m - 8f) G6: 16 (8m - 8f) G7: 18 (10m - 8f) G8: 16 (8m - 8f)	Hands-on activity using computer and/or tablets PCs. Main technologies: Communication (E-mail, Web Blogs, Skype, Facebook, Life2.0 project platform[5]); Search for information (Google search tools, Google Maps, Youtube, Spotify, video web portals, buying online, Picasa); Editing multimedia (Picnic, Windows Movie Maker).	G1: 05 sessions G2: 12 sessions G3: 12 sessions G4: 05 sessions G5: 12 sessions G6: 06 sessions G7: 04 sessions G8: 04 sessions
	Project	G1: 16 (8m - 8f)	G1, G2: Participatory design	G1, G2: 01

[4] Connect: European project on older people's virtual communities and social learning (http://www.connect-project.eu).

[5] Life 2.0: European project aiming at generating opportunities for local interaction by creating new services for older adults (http://www.life2project.eu/).

	Activities: WorthPlay[6]	G2: 14 (9m - 5f) G3: 11 (1m - 10f) G4: 14 (7m - 7f) G5: 10 (2m - 8f)	activity: Creating and playing games. G3 to G5: Hands-on activity using computer and/or tablets PCs as a device to interact with Worthplay platform creating and playing games.	session G3: 03 sessions G4, G5: 01 session
	Participatory design workshops	G1: 10 (5m - 5f) G2: 11 (5m - 6f) G3: 17 (6m - 11f)	G1: "Collaborative maps and blogs". G2, G3: "Designing my online video portal".	G1, G2, G3: 01 sessions

Table 2 - General ICT courses.

3.5. Data gathering and analysis

The fieldworker took notes on her computer of what she observed and what participants did and said in courses and workshops immediately after a session. Courses and workshops were so active that hindered *in situ* note-taking. Notes were also taken of the fieldworker's face-to-face conversations with those participants that turned up a few minutes before a session was due to begin or when they met up for a coffee in a bar near AG.

The fieldworker also took notes on her computer on a daily basis of what participants wrote in Facebook. A Facebook group was set up by the fieldworker to provide a closed communication channel for the most active participants (44). This group also provided an opportunity to explore Facebook for those participants who were interested in it. The fieldworker was a Facebook friend of 50 participants and followed the YouTube uploads of three of them throughout the study.

Data analysis followed Gilbert's interpretation (Gilbert 2008) of Grounded Theory (Strauss and Corbin 1998), which provides practical guidelines to analyze

[6] WorthPlay: International project aiming at understanding what makes digital games sufficiently playable, appealing and meaningful for older people (http://worthplay.upf.edu/).

qualitative data. To begin with, the fieldnotes were initially coded line-by-line by the fieldworker, applying codes to each segment of the text (Open Coding) [7]. An example of the notes and the initial coding process is provided in Table 3. This fragment was edited and translated into English by the authors. Subsequently, the fieldworker identified relationships between the initial codes, resulting in themes (i.e., a combination of codes) and several preliminary categories (i.e., a combination of themes) (Axial Coding). Open and Axial coding were both conducted at the end of the courses.

At the end of today's session, a number of participants ([67, M52], [71, M24], [75, M3]) attempted to transfer some pictures from their smartphones to one of the computers. While they were doing so, [70, F21] told me: "*We took a lot of pictures with the phone during a religious procession in the Rambla. We now want to move the pictures from the phone to the computer so that we can create a video with them.*" (She keeps talking about the procession and their experience that day). After some minutes of trying, one of the participants made this comment loudly: "*We can't download the pictures to the computer, can you help us?*"	Showing interest in the activity, collaborative learning, working with a new device. Recording media in everyday life, recording public event, using phone to record media. Aiming to create video about a meaningful event. Spontaneous learning of a new device, difficulties in downloading pictures from the phone. Help needed.

Table 3 – Excerpt of fieldnotes and Open Coding.

The results of these analyses were used for planning the next courses and workshops. The preliminary categories that emerged from Axial Coding were then discussed among the authors until a clear outcome was agreed. In these discussions, we wrote drafts, changed the name of some categories, deleted, and grouped them into

[7] We used the software NVivo in order to facilitate the data analysis.

other categories. This data analysis led to the following main categories and subcategories, which we used in order to present the results:

- Digital video production: motivations, planned video creation, creative editing, characteristics of the final videos.
- Digital video appropriation: social appropriation, privacy, controlled and meaningful sharing, impact on perceived wellbeing.
- Interaction issues over time: issues, solutions, evolution over time.

4. Digital video production

4.1 Motivations

By creating digital videos, our participants perceived that they could:

- Share with their relatives and friends key moments of special occasions, such as a trip around the Mediterranean: "*I want to create a video with the photos I took with my digital camera during my trip with my friends and partner in Tunisia. We had such a great time. I want to burn the video into a DVD and give it to them*" [75, M3][8].
- Keep alive memories of their relatives, especially those who were deceased, and share these memories with other family members: "*I've created a video about my family. I've got many pictures of my family, old ones, from people that are already dead, and more recent ones, from the new generation. One day I came*

[8] The code for participants' identification consists of: (a) their age, (b) their sex (F. female, M. male) and the numerical ID that the fieldworker assigned to them.

up with the idea of creating a video representing my family tree and passing it on to the youngest members of my family" [75, M27].

- Take forward their journey towards ICTs proficiency: "*The good thing about creating videos is that there are many effects and cool things* (…) *there is always something new to learn*" [68, M28].
- Feel more socially included, "*Nowadays, it's important to know how to use computers in order not to be excluded from society*" [63, F13].

The first important results that our ethnographic study helps us to identify are the importance of an event, documenting family history, and achieving personal objectives that made digital videos relevant for our participants and encouraged them to engage in digital video production. Keeping and sharing memories have motivated older people with different cultural backgrounds to engage with user-generated content (Karahasanović et al. 2009; Harley and Fitzpatrick 2008). Recording events also motivated adult people in families to find value in digital videos (Kirk et al. 2007). By contrast, attaining personal objectives, such as learning more about ICTs, and feeling more socially included, seem to be more specific motives of our participants. Their videos going viral was not among our participants' motivations for producing them. However, "35% of (American) adults who post videos online have posted a video with the hope it will be seen by many people or going viral" (Purcell, 2013, 3). These differences in aspirations might be due to the setting where we conducted our study and the profile of our participants. It is worth noting that our participants' curation, which is "a growing phenomenon" (Thomas and Briggs 2014, 238), is actually becoming digital.

4.2 Planned video making

As stated in the Introduction, the making of digital videos of our participants differed

considerably from the spontaneous and ubiquitous video-content generation exhibited by teenagers in (Kirk et al. 2007). Compact digital cameras, camera phones or tablets (Figure 2a and 2b) were used when our participants intended to keep and share memories of special events. By contrast, pictures downloaded from Google were integrated into a digital video using MovieMaker, which was installed in the computers available at the AG Internet room, when enhancing their ICTs proficiency.

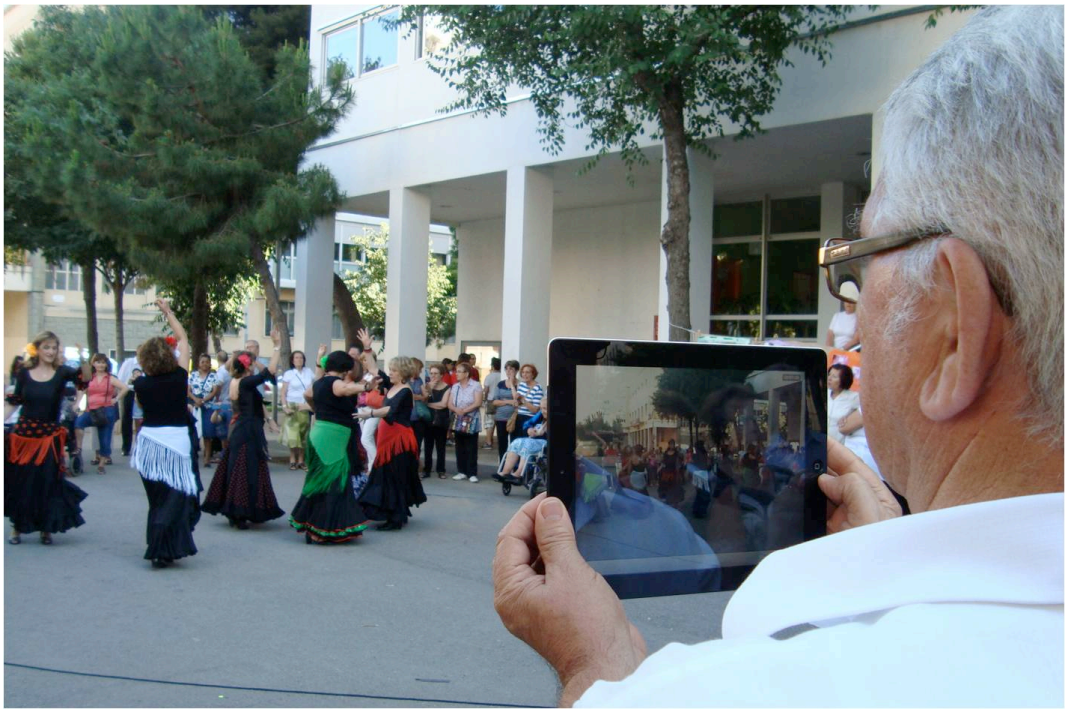

Figure 2a – A participant recording a dance presentation with a tablet.

Figure 2b – A participant using a digital camera to record an event in AG.

Interestingly, most of the planned digital videos had music. The fieldworker did not teach participants how to download online music. They reported that they had learned to do so by themselves or with the support of younger relatives. Most participants had a USB stick with a collection of their favorite songs, which they added to their videos, "*I choose the songs that I really like and then I save them in my computer. I've got the pen drive full of songs.*" [60, F25]. The results of a recent and novel study about DIY (Do-It-Yourself) and older people pointed out that an "unexpected finding was the pivotal role of actively collaborating to play music" (Y. Rogers et al. 2014, 3914). Participants' initiative to add music to their videos, in light of the illustrative extract quoted above, supports that this finding is more widespread. Indeed, the role of music in participants' digital video production is consistent with the importance of music in older people's lives (Hays 2005).

4.3 Creative editing

All participants, regardless of being more or less familiar with ICTs, showed a high level of creativity while editing videos. Participants with more video editing experience tended to explore the editing tools (e.g., advanced options), while those with less experience used the most basic functions. Yet, participants' creativity showed up in the selection of tools, topics, animations, colors, fonts and music, as the following edited extracts of our fieldnotes illustrate.

Maria, a 78 year-old woman, created a digital video and projected it on the big screen in the AG computers room to show it to other participants. The video had two parts. The first was about the *castellers*, a Catalan tradition of building up human towers. The second showed people cooking *paella*, a traditional dish with seafood and rice. The first part did not have music, so we could hear the background music of the *castellers* and the voices of the people. Maria had used traditional Spanish music for the second part. Besides its title and credits, the video had textual comments overlaid in different scenes. Maria told us that she had written these comments, which were descriptive and humoristic. Some participants pointed out that the music was not very well finished. I took the opportunity to explain them how they could change the volume of the different audio tracks. Maria asked: "*So if someone says something interesting in the video, can I put the volume down just for a few seconds and put the music back later on?*" Maria took advantage of this session to ask the fieldworker further details about animations and how to overlay text. A few days later, Maria e-mailed the fieldworker a new version of the video. She had fixed the problems with the music and changed the colors of the texts in a creative way.

Before starting the video classes, Pepe (aged 77) had previous experience of creating and sharing very nice MS Power Point presentations. He was anxious to create digital videos. Oftentimes, however, he felt a bit frustrated because he was faced with difficulties in learning new tools and could not express himself in the way he wanted to. After a couple of sessions, Pepe came up with an idea and became thrilled again with his videos: "*I added those images to the Power Point, made a composition with them*

and saved each slide as a new image. Now I have all these cool compositions that I'm adding to the Movie Maker. I will put some cool effects on it and create a very nice video." Pepe combined the MS Power Point and the Windows Movie Maker to create two videos, one about an historic street in Barcelona and the other about the importance of friendship. He shared both videos with his colleagues in their Facebook group.

While editing a digital video that is going to be both displayed in public and discussed is a reasonably expected practice – in other words, something that everybody does or is likely to do - the creativity shown by our participants is worth noting. Current HCI research with older people is dominated by removing usability and accessibility barriers, failing to pay enough attention, or overlooking, other aspects, such as older people's creativity and self-expression, "as if creativity and outstanding performance were not significant parts of aging" (Cohen 2006, 8).

4.4 Characteristics of the videos produced

During this study, we registered 320 videos produced by the participants[9]. In keeping with their motivations, 57.8% of them were about special events, such as birthday parties or trips, documenting memories of their relatives or their hobbies; 42.2% were about other events meaningful for them, such as neighborhood parties or AG activities; 38.7% of the videos were created with still images using a video-editing suite; 61.3% were recorded using camera phones, tablets or digital cameras. The overwhelming majority of videos lasted between 1 and 3 minutes and had an mp3 file (a song) attached.

[9] A number of videos, which participants decided to share publicly, are available at https://www.youtube.com/channel/UCYT5CYWdgdv5O6QrbNkxbFg

It might be worth noting that the type of video content produced by our participants differs considerably from the kind of content authored and shared by children and teenagers in public online video platforms discussed in (Yarosh et al. 2016). While youth use online video as staged, scripted, or choreographed videos, our participants used online video as an archive. This difference might be accounted for by several motivations behind engaging in digital video production by different populations (e.g., self-expression in the case of children and teenagers vs. keeping memories of special events in the lives of older people, such as our participants).

5. Digital video appropriation

It is through their appropriation that artefacts become authentic objects and achieve significance (Silverstone and Hirsch 1992). Thus, one way of assessing the potential significance of the digital video production presented in Section 4 is to address the question of how videos were appropriated. That is, how did participants take possession of digital videos? What meanings did they ascribe to them? How did digital videos move from artefacts to meaningful objects? Did anything "unusual" appear in the acts of appropriation of our participants?

5.1 Social appropriation

Participants' appropriation of digital videos was highly social. Participants perceived that sharing their digital videos with people they cared for, especially their children, grandchildren and close friends, could strengthen their ties with them. Sharing a video was a way of:

- Giving a present, "*My daughter's birthday is in February and I want to give her a video as a present. She is a bit sick so I want to do something nice for her*." [60, F25]
- Saying 'Hi', "*I liked the video a lot, it nearly gave me goose bumps*!" [41, F70] "*Hi! Show it to your mom please! A special kiss for both of you*!" [64, F16] (Conversation on [64, F16] Facebook wall)
- Catching up with friends, "*We're watching a video on my iPad. I recorded a couple of videos of my grandchildren this weekend and I was showing the videos to them before the session with you was due to begin. We took advantage of this to catch up on things, you know*." [76, F39]

Participants also reported, and our observations confirmed, that their perceived digital and social inclusion increased when other participants and relatives recognized their technological expertise when sharing a digital video in Facebook, "*It's beautiful! Next time we meet you should tell me how you recorded it!"* ([74, M2] comment on a video posted in Facebook by [77, F9]) or "*Congratulations for your progress!*" ([75, M3]'s Facebook friend comment on his wall).

These results show that participants ascribed different meanings to digital videos when they *owned* them. Videos of special events and deceased relatives showed participants' proficiency with ICTs and / or care for people they loved. These videos became an important element of their inter- and intra-generational communication. This appropriation of digital videos has not been discussed in previous Computer-Mediated Communication (CMC) research with older people, wherein videos are used as either synchronous or recorded conversations that help to 'connect families' (Judge et al. 2011; Brush, Inkpen, and Tee 2008) and provide older people with 'social support' (Xie 2008).

5.2 Privacy

It was scary for all our participants to think that the "whole Internet", as they put it, could watch their videos. As one might expect, this concern was especially apparent when the content of the video was personal: "*Why do I have to upload it to YouTube? There everyone can see it... I don't want everyone to watch it, just us in the class is ok. Well, never mind, I'll send it by e-mail then.*" [75, M3] More surprising, especially in terms of ageing myths when it comes to ICTs, e.g., incapable of learning new things and technologies (Durick et al. 2013), might be the fact that most participants showed a critical attitude towards the 'broadcast yourself' model promoted by video sharing sites, especially YouTube. "*No, this thing isn't for me* (talking about uploading videos in YouTube)*. I created a PowerPoint video tutorial to share it with my students. I can share it with you, if you want. You can share it with any person you want but online with unknown people no. If I share it with people I know, I know they'll like it, and they will show their gratitude to me. But people from the whole Internet… Why would I share it with them?*" [68, M28] This shows that not only did participants learn how YouTube works, but also decided how, in this case, not to use it.

Despite older adults being widely regarded as a very heterogeneous user group (Gregor and Newell 2001), privacy concerns with respect to public access to personal media on the web have been reported in studies of SNS (Social Network Sites) use by older people with different cultural backgrounds (Gibson et al. 2010; Lehtinen, Näsänen, and Sarvas 2009; Harley, Howland, and Harris 2014). Similar privacy concerns have also been raised in studies involving older people and video-sharing sites (e.g., YouTube, (Sayago, Forbes, and Blat 2012)) and addressing their attitudes towards emerging digital legacy tools (Thomas and Briggs 2014). These findings seem to

suggest that older people, in terms of privacy online, might not be such a heterogeneous user group.

5.3 Controlled and meaningful sharing

There is room for thinking that privacy concerns could have hindered or prevented the social appropriation of digital videos from happening. Yet, participants adopted three different strategies for sharing videos in a controlled and meaningful way.

- Co-located one-to-one and one-to-few. The content of the video was always personal and shared with people participants knew well. For example, participants put videos on USB drives or DVDs and passed them on to relatives: "*I used to have my videos in the computer. But some people of my family wanted to watch them, so it is easier for them if I record the videos on a DVD and give it to them."* [66, M29] "*This weekend I'll visit my son, he has a modern TV. I'll bring the pen drive to show him the videos I made in the course on his TV*." [75, M41]
- Online one-to-one and one-to-few. An alternative sharing strategy was observed when participants created a video and wanted their friends and family members to watch it. The most common way of sharing the video was to send the file via e-mail, either as an attachment or a link using file transfer tools (e.g., *WeTransfer*). The more experienced participants shared videos via *WhatsApp* too*:* "*Look, this is the video I recorded from the lunch last weekend* (showing the video in a *WhatsApp* conversation)*. I sent it to my partner's son, who was also there. He told me that he liked it a lot.*" [75, M3]
- One-to-many in SNS. Only those participants who had more practical knowledge of ICTs shared videos on SNS, especially through Facebook. They

did so by uploading videos in their profile pages or on their friends' walls. The videos shared were mostly related to artistic presentations, such as a typical Spanish dance. Participants pointed out that sharing these videos on SNS allowed them to reach people that could be interested in them in a non-intrusive way. E-mails were not considered appropriate for doing so: "*I give the name of my YouTube channel to people, so if they want, they can go and watch the videos. This way, I don't have to e-mail them every time I create and upload a video. If their friends are also interested in the videos, they can also watch it, I don't mind. These videos aren't private.*" [74, M2]

Thus, participants came up with their own solutions to share digital videos in a controlled and meaningful way. These different sharing strategies reinforce the creativity found in digital video production (section 4) and had a positive impact on their perceived wellbeing, as we discuss in Section 8.

6. Active engagement with ICTs, interaction issues and heterogeneous / homogeneous ICTs use: evolution over time

Within HCI research with older people, there is an increasing interest in understanding how valid the results of the research conducted thus far will be when most of today's adult people, who have previous experience of using contemporary ICTs, grow older (Hanson 2009). Drawing upon the longitudinal aspect of the data gathered in our study[10], and our analysis of the literature, in this section we discuss the expected

[10] As stated in Section 3.3, 14% of the participants were involved in the learning activities during the entire duration of the study, while approximately 39% took part in two or more courses, and 47% attended one full course/workshop.

evolution over time of three key[11] results of our ethnographic study: active engagement with ICTs, interaction issues, and heterogeneous / homogenous ICTs use. Although this discussion might be regarded as speculative, after 3 years of ethnographic research, we consider that we should be able to address (at least, partially) this important question.

6.1 Active and creative engagement with ICTs: more the norm than the exception

The results have portrayed our participants as active and creative makers of digital videos with contemporary video capturing, editing, and sharing technologies over an extended period of time. This portrayal challenges the current widespread characterization of the relationship between older people and ICTs, namely, considering that older adults do not have sufficient skills to master these technologies or show a lack of interest in them. However, our results suggest that there is room for conceptualizing older people within HCI in a different, more active way, as some of them might no longer be "characterized as consumers, rather than producers, of digital content" (Waycott et al. 2013, 39). This apparent contradiction might be accounted for Rogers' seminal theory of diffusion of innovations and categorization of users, ranging from early adopters to late adopters or laggards. According to this theory, the reference point of the laggards is the past and they buy new products when they are more or less forced to do so (Rogers, E., 1995). In the case of our participants, we could regard them as

[11] Technology evolves and a key question is to how (older) people are going to understand it, use it, and incorporate it into their lives in the future. Thus, addressing the question of how the next generation of older people will produce and appropriate digital videos in their lives is very interesting and, at the same time, difficult to predict, given that empirical evidence is needed. Future research studies (perhaps, adopting an ethnographic lens) can address this question.

early adopters.

Yet, we consider that it is wrong to assume or expect that the next generation of older people will *all* be either early adopters or motivated to engage in digital content production tasks just because they have access to, or the knowledge to use, digital technologies. In their later life, they might well want to carry out other activities. Still, the increasing digitalization of services (e.g., e-government, e-banking), the growth of the percentage of adult people who post online videos they have created or recorded themselves (Purcell, 2013), and previous experience of using today's ICTs, suggest that most of the members of the next generation of older people will probably exhibit a more participative role in using ICTs and creating digital content than most of today's older people do. Thus, an active and creative engagement with ICTs could (and should) be more the norm than the exception in the near future.

6.2 Cognitive-related interaction issues are time-persistent

Table 4 presents the most important interaction issues that participants had to deal with while creating, editing, and sharing digital videos. Some of these issues were time-persistent while others were overcome as participants gained more experience with the digital video creation process.

Issues	Description and examples	Type and evolution
Too much information	Participants struggled to identify the "upload" function in Facebook and YouTube because their user interfaces were, in their opinion, full of options and cluttered. Participants complained about the large number of functions in video editing suites such as Adobe Premiere or Sony Vegas Pro, "*I installed Adobe Premiere into my computer but I don't know how to use it. It's too complicated!* [73, F24]	Type: Time-persistent. Evolution: All considered that the user interfaces of video editing suites, sharing sites, and SNS, provided them with too much information and functionalities.
A network	The digital video production of our	Type: Time-persistent

of devices	participants involved a network of devices, such as video/photo cameras, computers and USB sticks. This network forces them to know how to operate, for instance, a camcorder or a mobile phone, the computer and to connect both devices by means of a USB cable. Participants found it difficult to deal with this network of connected devices.	Evolution: This issue did not disappear as the participants' ICTs experience increased. Instead, the more experience our participants had, the more new devices they added to the network, such as smart phones and tablets.
Too many steps	Installing video editing suites in PCs or setting up SNS accounts on mobile devices involved far too many steps for our participants. "*I want to share the videos from my iPad to my YouTube channel but I don't know how to do it. Can you configure it for me, please?*" [74, M2]	Type: Non time-persistent Evolution: Change of participants' behavior. Participants exhibited an explorative behavior when they felt more confident about their abilities to use ICTs than they did when they had less experience with these technologies.
Lack of feedback	When recording videos with their digital cameras (such as Sony dsc-s730) for the first time, the recording time feedback provided by the system was not clear enough. This apparent lack of feedback made participants feel confused, as they did not know whether they were recording a video. "*Yesterday I tried to make a video for the first time. I thought I had done it well but now I cannot find the video."* [61, F27]	Type: Non time-persistent Evolution: This apparent lack of feedback was only important when participants did not have much experience with the tools they were using.
New terminology	Computer jargon such as 'media file formats', 'computer file systems', 'projects', 'timeline' and 'file size limitation' were new words for our participants. When they first read them they did not understand them. Failing to understand the meaning of these terms led to participants not being able to share videos by e-mail on their own.	Type: Non time-persistent Evolution: As participants' experience increased, they learned new terms and did incorporate them in their conversations about these technologies, e.g., "*I often convert my videos to VLC so that I can watch them on the TV.*" [66, M29]

Table 4 - Interactions issues over time.

The results presented in Table 4 can be taken as an indicator of those interaction issues that the next generation of older people (Hanson 2009) will probably need to cope with

when they find themselves surrounded by unfamiliar technologies. Having to deal with too much information and learning to use a growing number of unfamiliar ICTs were time-persistent issues. Unfamiliar terminology, too many steps to conduct tasks, and poor visual feedback, were, however, overcome through practice. These results could inform the current endeavors which are being made in order to bridge the grey digital divide by making user interfaces more usable and accessible to the older population (for instance, guidelines – see Section 8). Namely, our results can encourage interaction designers and researchers to pay special attention to age-related changes in cognition, especially those concerned with crystallized / fluid intelligence and selective attention (Czaja and Lee 2007). At present, cognitive-related issues are not effectively solved by either design / technology or practices (e.g., note-taking) that older people can develop by themselves to deal with these issues (Sayago & Blat, 2011).

6.3 ICT use: both heterogeneous and homogenous

Despite the fact that technology appropriation can be regarded as a fairly idiosyncratic process, we found more similarities than differences in how our participants made and appropriated digital videos in their everyday lives. This finding might be due to the fact that: (a) our participants belonged to the same lifelong learning community, and (b) our study was conducted in courses in which the needs and interests of participants prevailed over researchers' interests. Yet, we also observed that privacy concerns with respect to SNS and digital legacy exhibited by older people with different cultural backgrounds resonate with those of our participants when dealing with digital videos. Furthermore, the relevance of communication in our participants' digital video appropriation could be expected, as communication serves key functions in ageing (Nussbaum et al. 2000).

Whilst differences between older people with more or less experience with ICTs might emerge under laboratory conditions (e.g., (Czaja and Lee 2007; Hanson and Crayne 2005)), when their interactions with ICTs are examined within local communities and over an extended period of time, differences in ICTs use might not be so clear cut.

7. Discussion

In this section we discuss four key aspects of our findings. In 7.1, we discuss differences and similarities between younger and older people digital video and content creation in an attempt to contribute to this research area and highlight the special characteristics of older people usage behavior. In 7.2, we discuss the degree to which the digital video appropriation of our participants can be regarded as surprising or expected. In 7.3, we tackle privacy issues, and in 7.4 we argue that our results encourage us to suggest re-framing the relationship between ICT and older people in a more positive way.

7.1 More differences than similarities between older and younger people digital video and content creation

With respect to digital video production, in Section 4 we argued that, unlike teenagers (Kirk et al. 2007), the making of digital videos of our participants was much more planned. We also pointed out that creating viral videos, which is an aspiration of some American adult Internet users (Purcell, 2013), was not among the key motivations of our participants for engaging in digital video production. We also highlighted that the content of the videos produced by our participants differs considerably from the kind of content authored and shared by children and teenagers in public online video platforms discussed in Yarosh et al. (2016). While egocentrism manifested itself in the videos

authored by children and teenagers, self-expression (e.g., choosing a specific music or a text to add to the video) was more prevalent in the videos created by our participants.

With respect to digital video appropriation, our results have stressed the relevance of privacy, which is also very important in the research area of the social lives of networked teens (Boyd 2014) and youthful digital content creation (e.g., Livingstone 2008). However, while teenagers seek privacy online in relation to those who hold power over them, for instance, by trying to avoid surveillance from parents and teachers (Boyd 2014, p. 56), our participants' quest for privacy is prompted by two main factors (we did not observe others, such as previous experience with ICT or age): (i) the content of most of their videos and (ii) their personal motivations for appropriating digital videos. Being able to achieve privacy by, for instance, making an effort to minimize (or personalize) the visibility of their video, is an expression of agency, which is common to both teenagers and our participants. However, human agency seems to have been overlooked in the most predominant relationship between older people and ICTs described within HCI, since they are usually seen as passive users of ICTs (Waycott et al. 2013).

Overall, we found more differences than similarities in digital video production and appropriation between older and younger users, and this might be accounted for by the life experiences of older people, i.e., older adults bring with them knowledge and lessons learned over a lifetime, as well as aspirations for their later life, which younger generations are unlikely to have.

7.2 Appropriating digital videos for communication: surprising or expected?

We have shown how our participants appropriated digital videos as a means of reinforcing and enriching inter- and intra-generational communication and getting social recognition within their local communities. This video-mediated communication

includes different types of technologies, actors, and content. This finding should not be striking when it is seen from the viewpoint of the importance of communication in ageing (Nussbaum et al. 2000). However, the way in which our participants created, edited, and shared digital videos is less expected, given the predominant 'downside of ageing' message within HCI, and challenge most of the myths of ageing and digital technologies (Durick et al. 2013). Their appropriation of digital videos put forward a type of Computer-Mediated Communication (CMC) in which a rich combination of technologies and face-to-face interactions amongst peers (e.g., collaboration, cooperation, support) play a key role. However, it has received very little research attention thus far. There are studies on e-mail systems, video messaging, blogging, SNS, and mobile phones with older people, in which videos are or might come into play (e.g., Selwyn et al. 2003; Righi, Sayago, and Blat 2012). Yet, the different communication practices established around the digital video as a communicational object and, especially, the production practices do not seem to have been addressed thus far. This opens up some design opportunities, based on a more positive point of view about ageing and ICTs, which we discuss in Section 8.

7.3 Sharing digital content to enrich ties with family and close friends. What about privacy and extending their social network?

Privacy is important in CMC research with older people and in our results (Lehtinen, Näsänen, and Sarvas 2009; Gibson et al. 2010; Ferreira, Sayago, and Blat 2014). However, this is not to say that all our participants were against others watching their videos. Indeed, some participants were motivated to share content with 'friends of friends', and this presented them with a scenario in which privacy could play a role. The participants who engaged in this one-to-many sharing strategy had experience of using ICTs and knew with whom they were sharing the content. Also, they adopted this

strategy to share contents that did not concern their personal life. Adopting this sharing strategy was beneficial as well, as it allowed them to be recognized by other members of the communities they belonged to. In this case, social recognition was more important than privacy.

This finding suggests the potential of applying ICTs to enrich, in a meaningful and controlled way, older people's communication with unknown people and to develop new relationships (Harley, Howland, and Harris 2014; Harley and Fitzpatrick 2009). In his recent work, Harley et al (Harley, Howland, and Harris 2014) highlighted the fact that besides the family, there are also other relationships that are important to older people. They argue that in addressing older people's social isolation and loneliness, it seems pertinent to provide opportunities for engaging with strangers, making new friends, and developing self-expression and relatedness. Our results support this argumentation, and indicate that there is room for further investigation in this area.

7.4 Re-framing the relationship between ICTs and older people in more positive terms

Much HCI research with older people can be summarized in terms of the "rhetoric of compassion" (Y. Rogers and Marsden 2013, 48) i.e., helping older people to conduct instrumental tasks with ICTs by accommodating for normative age-related changes in functional abilities. While helping older people to cope with changes that come with ageing is to be commended, and our results have shown the relevance of this approach, we also consider that there is room for re-framing the relationship between older people and ICTs in a more positive way.

Participants' creativity showed up in how they made videos and overcame some of the interaction issues they were faced with. Participants selected and combined different digital tools, taking into account their ICT experience, and their strategy to

create and share videos. The selected topics, visual effects, words used in the title of the videos and in the credits, the type of font and colors, and where this textual information was displayed on the video, were also important to improve the aesthetics of the video. Instead of thinking of how to make the task of recording a video through a camcorder or mobile phone more accessible and usable for older people, we could re-write the question as how to support and facilitate their creativity when recording videos with these devices. Re-framing the question in this way would widen the design space, wherein compensating for the downsides of ageing will be just one part of the answer, albeit a very important one.

8. Where do we go from here?[12]

This section intends to discuss the extent to which the digital video production and appropriation presented in this paper aids in understanding further the relationship between older people and ICTs. This section also aims to inform future research and design activities in HCI with older people.

8.1 Are technologies designed specifically for older people always needed?

It is fairly well established that older people find most ICTs difficult to use. There is also growing awareness that if we want them to use ICTs and bridge the grey digital divide, we need to design technologies for them. For instance, Waycott et al argue that "if (they) are to become digital content producers as well as consumers, it is necessary to provide tools enabling them to easily create and share content in non-threatening and supportive environments" (Waycott et al. 2013, 41). Our participants created, edited,

[12] The title of this section is borrowed from, in our opinion, the inspiring and seminal "Design for older and disabled people–where do we go from here?" (Newell and Gregor 2002).

published, and shared digital videos with a number of ordinary technologies over a 3-year period. However, they did find difficulties and their profile is fairly representative of most of today's older European people[13]. Thus, what might set our participants apart is their strong motivation to incorporate ICTs in their everyday lives. Other studies have focused on what makes older people unwilling to use ICTs (Kurniawan 2007; Fernández-Ardèvol and Prieto 2012). Unlike them, we decided to capitalize on our participants' motivation to examine their use of ICTs.

We found that older people might not *always* need technologies specifically designed for them, as one might be tempted to believe when first thinking about or witnessing older people using ICTs for short periods of time. This is not to say that technologies specifically designed for older people are not needed. There are older adults, especially those with major declines in functional abilities, who will probably benefit from them, and later on in this section we provide some design opportunities for enriching current design knowledge for this user group. Our results, however, suggest that general and important claims, such as "older people are different" (Gregor and Newell 2001, 90), which aim to encourage researchers and designers to appreciate the diversity in needs and abilities of older adults in order to design more accessible and usable technologies for them, should be approached with caution and within the everyday lives of older people.

8.2 Does using ICTs have a positive impact on older adults' perceived wellbeing?

Drawing upon a comprehensive literature review, Dickinson and Gregor came to the conclusion that "computer use has no demonstrated impact on the wellbeing of older

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[13] They experience normative age-related changes in functional abilities, have a moderate practical knowledge of ICTs and fairly low/moderate levels of educational attainment.

people" (2006, 744). Seven years later, drawing upon another extensive literature review, Parra *et al* pointed out that an important limitation of research on active ageing and ICT is that "much IT is being developed but there is a minimal amount of research and testing on the efficacy of these technologies. To what extent do they really accomplish the goals of prevention, care, compensation and enhancement is a topic that must be further explored in the future" (Parra, Silveira, Far, & Daniel 2014, 421).

This paper fills this gap (at least, partially) by drawing upon an ethnographic study providing evidence of how the process of using, creating, and sharing digital videos (e.g., in social settings, in company of peers) did have a positive impact on the perceived wellbeing of our participants. They reported, and our observations confirmed, feeling more socially and digitally included, and closer to their relatives and keeping up with the times as a result of appropriating digital videos and engaging in digital video production. Whereas using ICTs might not always have a clear impact on their perceived wellbeing - brain training games are a noteworthy example (Owen et al. 2010), the ethnographic lens through which we looked at ICTs use by our participants enabled us to realize that learning, taking up intellectual changes, sharing concerns with peers, socializing, helping others, and realizing they are still able to carry out activities they thought they would never be able to do, are all part of what makes using ICTs a positive and worthwhile experience for them.

8.3 Understanding real users in real contexts of use towards achieving social impact

We consider that digital video production and appropriation is difficult, if not impossible, to examine in studies conducted within laboratory conditions. Unlike these other studies, we were lucky enough to perform ethnography over a 3-year period. Our results, as we have already discussed, present a different and novel portrayal of older

people that reduces a gap in knowledge, challenges some taken-for-granted ideas, and encourages reflection on 'where do we go from here'. How do we know whether older people need different ICTs or improved versions of existing ones in their everyday lives? Why did creativity emerge as a key finding in our study? Answers to these and other similar questions rest heavily on understanding older people's situated use of ICTs, and ethnography is, or should be, well placed to do so. However, ethnography has seldom been adopted in the studies addressing the topic of this paper, despite the fact that there is a growing interest in shifting the interest of designers from an artificial "average user" to real users in real contexts of use (Luigi 2009).

Moreover, the results showed that our ethnographic approach turned out to be *useful* for the participants, who reported, and our conversations confirmed, learning a wide range of ICTs and feeling more confident about their abilities to effectively use and incorporate these technologies in their everyday lives. We do not claim that other research approaches should be avoided. Instead, combining ethnography with studies conducted in more controlled situations or adopting other approaches (e.g., online data mining) can potentially help us achieve a deeper understanding of older people as consumers and producers of digital content, and to inform the design of better, more usable, accessible and meaningful, ICTs.

8.4 Towards enriching current design knowledge

Within HCI, numerous efforts have been made to help designers cope with diversity, spread design awareness, and best practices. Working towards this end, a substantial number of guidelines for designing more accessible user interfaces for older people have been produced (Echt and Morrell 2002; Hodes and Lindberg 2002; B Holt 1999; BJ Holt and Morrell 2002; Morrell 2003; Zajicek 2006; W3C 2010). One way of

appreciating how our results enrich this design knowledge is to discuss how the interaction issues summarized in Table 4 relate to the current body of design guidelines.

To the best of our knowledge, no design guidelines for older people have taken into account the evolution over time of usability and accessibility issues (i.e., how they evolve as older people's experience with ICTs increases over time). Our results suggest that making such a distinction is important to better inform user interface design.

Most of the interaction issues faced by our participants, such as too much information, unfamiliar terminology, and privacy control, have already been addressed by guidelines (e.g., Zaphiris, Kurniawan, and Ghiawadwala 2006; Chisnell and Redish 2005; Fidgeon 2006; Hodes and Lindberg 2002; Carmien and Manzanares 2014), and in recommendations for designing SNS for older people (e.g., Lehtinen, Näsänen, and Sarvas 2009; Harley, Howland, and Harris 2014). This fact can be seen as a validation of the design knowledge spread in the guidelines and reinforces the need of addressing them in future designs. In light of the effectiveness of our participants' efforts to cope with some interaction barriers, it could be argued that there is no need for solving or dealing with design issues such as privacy and unfamiliar terminology. However, the strategies adopted by our participants highlight the fact that (a) there are *still* barriers, and (b) these barriers can be taken as a source of inspiration for future designs[14]. Participants' willingness to use ICTs should not be taken as an excuse for taking no heed of older people's needs.

Finally, whereas too much information or too many steps are user interface design issues on which guidelines tend to focus, it is worth noting that the 'network of

[14] We have refrained from providing design opportunities, as they need to be discussed within the context of the particular interactive system to be designed.

devices' is a contextual aspect of technology use that does not seem to have been addressed by the guidelines cited above. However, emerging technological paradigm shifts towards the establishment of interfaces that are embedded in all kinds of objects (e.g., wearables (Barfield and Caudell 2001) and pervasive computing (Satyanarayanan 2001)) suggest that networks of devices are expected to be an important part of (older) people's interactions with ICTs in the (near) future.

9. Conclusions and future work

Over the course of an ethnographic study of ICTs use by a group of older people, we witnessed a change in their relationship with digital videos. They shifted from looking for and watching Internet videos to making their own digital videos, ascribing diverse meanings to these objects, and appropriating them in their everyday lives. These findings, along with the pervasiveness of digital videos by non-professional video makers in today's society, and a growing ageing population, encouraged us to examine what is currently known about digital video production and appropriation by older people.

Our literature review indicated that little if anything is known about how older people produce and appropriate digital videos. Thus, we decided to focus on this topic with the aim of reducing this gap in knowledge and taking further current research in HCI with older people. In light of the results presented and discussed throughout this paper, we argue that we have achieved these goals.

This study portrays older people as active and creative makers of digital videos with current video capturing, editing, and sharing technologies over a prolonged period of time. We have described a social appropriation of digital videos in which these artefacts become meaningful objects within inter- and intra-generational communication, and where privacy, controlled, and meaningful sharing strategies, play

a key role in the acts of appropriation. We have discussed how similar or different the key elements of digital video production and appropriation of our participants are with respect to the use of digital videos and other technologies by younger people. We have also argued that participants' production and digital video appropriation is not so heterogeneous as they, as a group of older people, are. By drawing upon the longitudinal aspect of the data gathered, we have also been able to engage in a discussion on which interaction issues are likely to be faced by the next generation of older people, and how this design knowledge enriches current design guidelines for older people.

We have argued that several implications for future HCI research with the older population can be drawn from the results. These implications challenge important taken-for-granted ideas, such as older people being passive consumers of digital information. This study also provides a different way of looking at older people. Not only can they become active ICTs users but also creative ones. The results prompt us to suggest re-framing the relationship between ICTs and older people in more positive terms, rather than on 'removing problems', which does not capitalize well enough on their strengths. The results also suggest conducting further research in real contexts of technology use in an attempt to inform the design of more accessible, usable and meaningful ICTs for older people, and conduct research activities with more social impact.

In terms of limitations and future research opportunities, the extent to which the results of our ethnographical study can be extrapolated to other settings and profiles of older people warrants further research. We have not addressed in depth either online privacy issues or the patterns of older people participation in video sharing sites with a broader user group. Future studies can explore further these aspects. In addition to this,

given that older people might be familiar with photo and/or videowork, it is reasonable to question whether other forms of digital content production (such as blogging or contributing in crowdsourcing platforms), and face-to-face practices around them, would yield similar or different results. Ethnographic and / or participant observation studies of digital content production by older people should help us understand this important aspect.

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